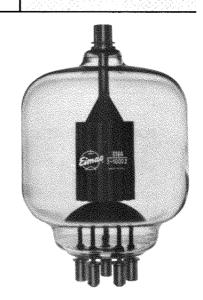


E I M A C
Division of Varian
S A N C A R L O S
C A L I F O R N I A

8164 3-1000Z

HIGH-MU POWER TRIODE

The EIMAC 8164/3-1000Z is a compact power triode intended to be used as a zero-bias Class-B amplifier in audio or radio-frequency applications. Operation with zero grid bias simplifies associated circuitry by eliminating the bias supply. In addition, grounded-grid operation is attractive since a power gain as high as twenty times can be obtained with the 8164/3-1000Z in a cathode driven circuit.



GENERAL CHARACTERISTICS

	EC	TI	216	. VI
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Fil	ament: Th Voltage		ited '	Tung	gsten										Min.	$\frac{Nom.}{7.5}$	\underline{Max} .	volts
	Current		-	-	_	_	_	_	-	_	-	-	-	_	21.5	1.0	22.7	amps
Ar	nplification		ctor	(Av	erage	:)	-	-	-	-	-	-	-	-	21.0	200	,	I
In	terelectrode	Ca	paci	tance	e (Gi	oun	ded	Catl	node)								
	Input	-	-		-				-	-	-	-	-	-	15.0		19.0	pf
	Output		-	-	-	-	-	-	-	-	-	-	-	-			0.3	pf_{c}
	Grid-Plat	te	-	-	-	-	-	-	-	-	-	-	-	-	6.0		9.0	pf
In	terelectrode	e Ca	paci	tance	e (Gr	oun	ded-	Grid)								400	c
	Input	-	-	-	-	-	-	-	-	-	-	-	-	-	15.0		19.0	pf_{c}
	Output			-	-	-	-	-	-	-	-	-	-	-	6.0		9.0	pf_{r_0}
	Plate-Ca	thoo	te	-	-	-	-	-	-	-	-	-	-	-			0.3	pf
Fr	equency for	r M	axin	num	Ratii	ngs	-	-	-	-	-	-	-	-			110	MHz
MECHA	NICAL																	
Ba	se	-	-	-	-	-	-	-	-	-	-	-	-	-	-		5 Pin S	pecial
M	ounting Pos	sitic	n	-	-	-	-	-	-	-	-	-	-	-	Vert	ical, bas	e down	or up
Co	ooling -	-	-	-	-	-	-	-	-	-	-	-	-	-	Rac	diation a	nd forc	ed air
Re	ecommende	d H	[eat-]	Dissi	patin	g P	late	Con	necto	or	-	-	-	-	-		EIMAC	HR-8
Re	ecommende	d S	ocke	t -	-	-	-	-	-	-	-	-	-	-	-	- E	MAC S	K-510
Re	ecommende	d C	him	ney	-	-	-	-	-	-	-	-	-	-	-	- E	MAC S	K-516
M	aximum Op	era	ting	Tem	ipera	ture	s:											
	Plate Se			-	-	-	-	-	-	-	-	-	-	-	-			225°C
	Base Sea	als	-	-	-	-	-	-	-	-	-	-	-	-	-		- 5	200°C
M	aximum Ov	er-a	all D	imer	sion	S:												
	Height	-	-	-	-	-	-	-	-	-	-	-	-	-	-			inches
	Diamete	r	-	-	-	-	-	-	-	-	-	-	-	-	-		5.25 :	inches
N	et Weight	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1.2 p	ounds



RADIO FREQUENCY POWER AMPLIFIER

Class C, Grid Driven

MAXIMUM RATINGS

DC PLATE VOLTAGE - - - 6000 VOLTS
DC PLATE CURRENT - - - 700 MA
GRID DISSIPATION - - 50 WATTS
PLATE DISSIPATION - - - 1000 WATTS

TYPICAL OPERATION

DC Plate Voltage 3000 4500 6000 volts DC Grid Voltage -30***-75** -100 volts DC Plate Current 700 700 700 mA DC Grid Current -230 240 250 mA 230 volts Peak RF Grid Voltage 107 200 27 *4* 8 Grid Driving Power -57 watts Power Output - 1300 2250 3200 watts *Operating bias may be wholly derived from grid current

flowing through 130 ohm, 25 watt resistor.

PLATE MODULATED RF AMPLIFIER

Class C

MAXIMUM RATINGS

DC PLATE VOLTAGE - - - 4500 VOLTS

DC PLATE CURRENT - - - 550 MA

GRID DISSIPATION - - - 50 WATTS

PLATE DISSIPATION - - - 670 WATTS

*Drive modulation is required with a high-mu triode

TYPICAL OPERATION*

DC Plate Voltage - - - - - 4500 volts
DC Grid Voltage - - - - - - - - - - - 100 volts
DC Plate Current - - - - - - 500 mA
DC Grid Current - - - - - - - 170 mA
Drive Power - - - - - - 35 watts
Output Power (carrier) - - - - 1765 watts

RADIO-FREQUENCY LINEAR AMPLIFIER

Clas B, Zero Bias, Cathode Driven

MAXIMUM RATINGS

DC PLATE VOLTAGE - - - 6000 VOLTS
DC PLATE CURRENT - - - 800 MA
GRID DISSIPATION - - - 50 WATTS
PLATE DISSIPATION - - - 1000 WATTS

TYPICAL OPERATION

DC Plate Voltage 2500 3000 volts Zero-Signal DC Plate Current -162 240 mA Max. Signal DC Plate Current -800 670 mA Max. Signal DC Grid Current -260 220 volts Max. Signal Drive Power -100 90 watts Plate Load Impedance 1760 2650 ohms Nominal Cathode Impedance -65 67 ohms 1080 watts Plate Output Power -1050 Intermodulation Distortion

Products:* 3rd Order - - -32 -29 db 5th Order - - 39 -37 db

AUDIO FREQUENCY AMPLIFIER OR MODULATOR

Class B

MAXIMUM RATINGS (per tube)

DC PLATE VOLTAGE - - - 6000 VOLTS
DC PLATE CURRENT - - - 800 MA
PLATE DISSIPATION - - - 1000 WATTS
GRID DISSIPATION - - - 50 WATTS

TYPICAL OPERATION

(Sinusoidal Wave, Two Tubes, Grid Driven)

3000 5000 volts DC Plate Voltage DC Grid Voltage 0 -13*volts Zero-Signal DC Plate Current -350 200 mA 1000 mA Max. Signal DC Plate Current -1450 Max. Signal DC Grid Current -485 310 mA 48 28 watts Driving Power - - -100 Peak AF Driving Voltage -90 volts Load Resistance Plate to Plate -3940 10,200 ohms Max. Sig. Plate Output Power -2540 3560 watts

NOTE: In most cases, "TYPICAL OPERATION" data are obtained by calculation from published characteristic curves and confirmed by direct tests. No allowance for circuit losses, either input or output, has been made. Exceptions are distinguished by a listing of "Useful" output power as opposed to "Plate" output power. Values appearing in these groups have been obtained from existing equipment(s) and the output power is that measured at the load.

^{*}Measured values in operating equipment.

^{*}Approximate Value. Adjust to provide stated zero-signal plate current.

APPLICATION

MOUNTING—The 3-1000Z must be operated vertically, base up or base down. A flexible connecting strap should be provided between the EIMAC HR-8 Heat Dissipating Connector on the plate terminal and the external plate circuit. The tube must be protected from severe vibration and shock. The EIMAC SK-510 socket or equivalent must be employed to prevent excess lateral pressure on base pins and seal of the tube.

COOLING—Forced-air cooling is required to maintain the base seals at a temperature below 200°C, and the plate seal at a temperature below 225°C. When using the EIMAC SK-510 Air-System Socket and SK-516 Chimney, a minimum air flow rate of 25 cubic feet per minute at a static pressure of approximately 0.43 inch of water, as measured at the socket at sea level, is required to provide adequate cooling at an inlet air temperature of 50°C. Above 30 megahertz the required air flow is increased to 35 cubic feet per minute at a static pressure of approximately 0.8 inch of water, as measured at the SK-510 socket. Cooling air must be supplied to the tube even when the filament alone is on during standby periods.

When a socket other than the SK-510 is used, provisions must be made for equivalent cooling of the base, the envelope, and the plate seal. In all cases, air flow rates in excess of the minimum requirements, will prolong tube life.

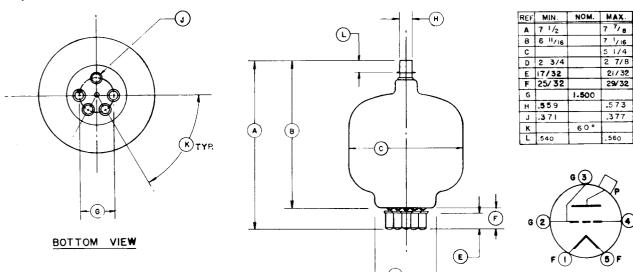
FILAMENT OPERATION—The rated filament voltage for the 3-1000Z is 7.5 volts. Filament voltage, as measured at the socket, must be maintained within the range of 7.13 to 7.87 volts to obtain maximum tube life. Operation at reduced voltage decreases emission capability, but increases life

INTERMODULATION DISTORTION—Typical Operating Conditions and Intermodulation Distortion Product values are derived from measurements made at 2 MHz and are referred to one tone of a two-tone test signal. As the driving signal is reduced below full peak envelope power, distortion products remain at, or better than, the indicated value.

CLASS C OPERATION—Although designed for Class B service, the 3-1000Z may be operated as a Class-C power amplifier or oscillator, or as a plate-modulated rf amplifier. The zero-bias characteristics can be used to advantage in Class C amplifiers by employing only grid leak bias. If driving power fails, plate dissipation is kept to a low level since the tube will operate at normal, static zero-bias conditions.

ZERO-BIAS OPERATION—Operating at zero-bias is not recommended with plate voltages over 3500 volts since plate dissipation may be exceeded. Similarly, the safety of zero-bias operation as mentioned above under "Class-C Operation" is not available at plate voltages above 3500 volts. Straight Class-C or Class-B operation is, of course, permissible up to 6000 volts where other ratings are not exceeded. INPUT CIRCUIT — When the 3-1000Z is operated as a grounded-grid rf amplifier, the use of a resonant tank in the cathode circuit is recommended in order to obtain greatest linearity and power output. For best results with a single-ended amplifier it is suggested that the cathode tank circuit operate at a "Q" of two or more.

SPECIAL APPLICATIONS—If it is desired to operate this tube under conditions widely different from those given here, write to Power Grid Tube Marketing, EIMAC Division of Varian, 301 Industrial Way, San Carlos, California, for information and recommendations.



A	7 1/2		7 7/8
В	6 11/16		7 1/16
С			5 1/4
D	2 3/4		2 7/8
£	17/32		21/32
F	25/32		29/32
6		1.500	
G H	.559	1.500	,573
	.559 .371	1.500	.573 .377
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